

## **Stratigraphical Position of *Helicosphaera waltrans* Nannoplankton Horizon (NN5, Lower Badenian)**

Stjepan ČORIĆ, Lilian ŠVÁBENICKÁ, Fred RÖGL & Pavla PETROVÁ

In the last few years Badenian sediments were studied through scientific projects at the localities of Austrian and Czech Republic parts of the Central Paratethys. Calcareous nannofossil and foraminiferal content of Lower Badenian sediments yielded new important stratigraphical data. A short biohorizon with *Helicosphaera waltrans* (described by THEODORIDIS 1984 from Gozo, Italy) within nannoplankton zone NN5 (*Sphenolithus heteromorphus* Zone; MARTINI 1971) was used for the subdivision of Langhian sediments in the Mediterranean (THEODORIDIS 1984; FORNACIARI et al. 1996).

*Helicosphaera waltrans* horizon was also recognized in the Lower Badenian sediments of the Carpathian Foredeep (ŠVÁBENICKÁ 2002) and used as a marker of zone NN5 (ČORIĆ & ŠVÁBENICKÁ 2004). Species *H. waltrans* was recorded in the following depositional areas of Central Paratethys.

### **Alpine-Carpathian Foredeep**

Grund Formation (Austrian part): borehole Roggendorf-1 and Grund section. *H. waltrans* was also observed in the assemblages with high percentage of *Coccolithus pelagicus* in siliciclastic sediments of the Gaindorf Formation (Mühlbach at the Manhartsberg, Lower Austria). *H. waltrans* was found in the outcrops of Central Moravia (Czech Republic) near Olomouc (localities Opatovice HJ-103, Šatov, Troskotovice, Hradčany, Kelčice (ŠVÁBENICKÁ 2002). Shallow water deposits of boreholes Ivan-1 and Vranovice-1 (located SE from Brno) contained *H. waltrans* with common specimens of genus *Micrantholithus* sp. and *Braarudosphaera bigelowii*. Overlying strata yielded nannofossils with alternating high numbers of small reticulofenestrids (forming 20–55% of assemblage) and *Coccolithus pelagicus* (30–70%). Here, the first occurrence of *H. waltrans* precedes first occurrence of foraminifer *Orbulina suturalis* (PETROVÁ & ŠVÁBENICKÁ 2007).

### **Vienna Basin**

In the Austrian part *H. waltrans* was found in marly sediments from Frättingsdorf (with diatoms and silicoflagellates) and at the sections of Niederleis. Foraminiferal assemblages here contain *Orbulina suturalis* and *Praeorbulina glomerosa circularis*.

In the Czech part (South Moravia) this species was found in association with *Helicosphaera walbersdorfensis*, *Sphenolithus heteromorphus*, *Calcidiscus* cf. *tropicus* and relatively common *Umbilicosphaera rotula* at the locality of Sedlecký mlýn, SE from Mikulov.

### Styrian Basin

This biohorizon outcrops in the Wagna quarry, at Retznei (RÖGL et al. 2006; LIRER et al. 2006) and Katzensgraben (near the Slovenian/Austrian border). Horizon with this form was also observed in sediments from borehole Perbersdorf 1 (SPEZZAFERRI et al. 2004). Sediments from the Styrian Basin are characterized by very abundant and well-preserved nannoplankton assemblages with the dominance of small reticulofenestrids: *Reticulofenestra minuta* and *R. haqii*. Regularly occur *Coccolithus miopelagicus*, *C. pelagicus*, *Calcidiscus premacintyreii*, *C. leptoporus*, *Discoaster varaibilis*, *D. deflandrei*, *Geminolithella rotula*, *Pontosphaera multipora*, *Reticulofenestra pseudumbilica*, *Sphenolithus heteromorphus*, *S. moriformis*, *Umbilicosphaera jafarii*, helicospherids (*Helicosphaera carteri*, *H. euphratis*, *H. walbersdorfensis*). Rare *Helicosphaera ampli-aperta* (NN2–NN4) in these sediments is probably the result of the reworking from underlying Karpatian sediments.

Planktonic foraminiferal assemblages of the biohorizon with *H. waltrans* are typical for the Lower Lagenidae Zone (RÖGL & SPEZZAFERRI 2003): *Praeorbulina glomerosa glomerosa*, *P. glomerosa circularis*, *Orbulina suturalis*, *Globorotalia bykovae*, *G. transylvanica*, *Paragloborotalia mayeri/siakensis*, *Globigerinoides bisphericus*. Also occur important benthic species: *Uvigerina macrocarinata*, *U. uniseriata*, *Vaginulina legumen*, *Lenticulina echinata*, *Psammolingulina papillosa*, *Pseudogaudryina lapugyensis*, *P. sturi*, *Colominella paalzowi*.

Rich calcareous nannoplankton and foraminiferal assemblages from biohorizon with *H. waltrans* are related to the Lower Badenian transgressive phase.

---

### Acknowledgements

The study was supported by the Austrian Science Fund (project No. P-13743-BIO) and the Grant Agency of the Czech Republic (project No. 205/04/2142 “Evaluation of sediments on the Karpatian-Badenian boundary in the southern part of the Carpathian Foredeep”).

### References

- ČORIĆ S. & ŠVÁBENICKÁ L. (2004): Calcareous nannofossil biostratigraphy of the Grund Formation (Molasse Basin, Lower Austria). – *Geologica Carpathica*, 55(2): 147-153, Bratislava.
- FORNACIARI E., DI STEFANO A., RIO D. & NEGRI A. (1996): Middle Miocene quantitative calcareous nannofossil biostratigraphy in the Mediterranean region. – *Micropaleontology*, 42(1): 37-63, New York.

- MARTINI, E. (1971): Standard Tertiary and Quaternary calcareous nannoplankton zonation. – In: FARINACCI, A. (ed.): Proceedings II. Planktonic Conference, Roma 1970. – Edizioni Tecnoscienza, 2: 739-785, Roma.
- LIRER, F., RÖGL, F., ČORIĆ, S. & HOHENEGGER, J. (2006): The Mediterranean and the Paratethys. New bio-stratigraphic tools for the correlation between these two different realms. – Pangeo Austria 2006, Conference Series: 179-180, University Press, Innsbruck.
- PETROVÁ P. & ŠVÁBENICKÁ L. (2007): Biostratigraphy and paleoecology of the Middle Miocene sediments in the Carpathian Foredeep, Czech Republic. – *Geologica Carpathica*, 58, Bratislava. [in press]
- RÖGL, F., ČORIĆ, S., HOHENEGGER, J., PERVESLER, P., ROETZEL, R., SCHOLGER, R., SPEZZAFERRI, S. & STINGL, K. (2006): The Styrian tectonic phase – A series of events at the Early/Middle Miocene boundary revised and stratified in the Styrian Basin. – European Geosciences Union, Geophysical Research Abstracts, 8: 10733.
- RÖGL, F. & SPEZZAFERRI, S. (2003): Foraminiferal paleoecology and biostratigraphy of the Mühlbach section (Gaindorf Formation, Lower Badenian), Lower Austria. – *Annalen des Naturhistorischen Museums Wien*, 104A: 23-75, Wien.
- SPEZZAFERRI, S., RÖGL, F., CORIC, S. & HOHENEGGER, J. (2004): Paleoenvironmental changes and agglutinated foraminifera across the Karpatian/Badenian (Early/Middle Miocene) boundary in the Styrian Basin. – In: BUBIK, M & KAMINSKI, M.A. (eds.): Proceedings of the Sixth International Workshop on agglutinated foraminifera (Prague, Czech Republic, September 1-7, 2001). – Grzybowski Foundation, Special Publication 8: 423-459, Krakow.
- ŠVÁBENICKÁ L. (2002): Calcareous nanofossils of the Upper Karpatian and Lower Badenian deposits in the Carpathian Foredeep, Moravia (Czech Republic). – *Geologica Carpathica* 53(3): 197-210, Bratislava.
- THEODORIDIS, S. (1984): Calcareous Nannofossil Biozonation of the Helicoliths and Discoasters. – *Utrecht Micropaleontological Bulletins*, 32: 1-271, Meppel.

Authors address:

Stjepan Čorić  
Geological Survey of Austria  
Neulinggasse 38  
A-1030 Vienna  
stjepan.coric@geologie.ac.at

Lilian Švábenická  
Czech Geological Survey  
Klárov 3/131  
CZ-11821 Prague 1

Fred Rögl  
Natural History Museum Vienna  
Geological-Palaeontological Department  
Burgring 7  
A-1010 Vienna

Pavla Petrová  
Czech Geological Survey  
Leitnerova 22  
CZ-65869 Brno